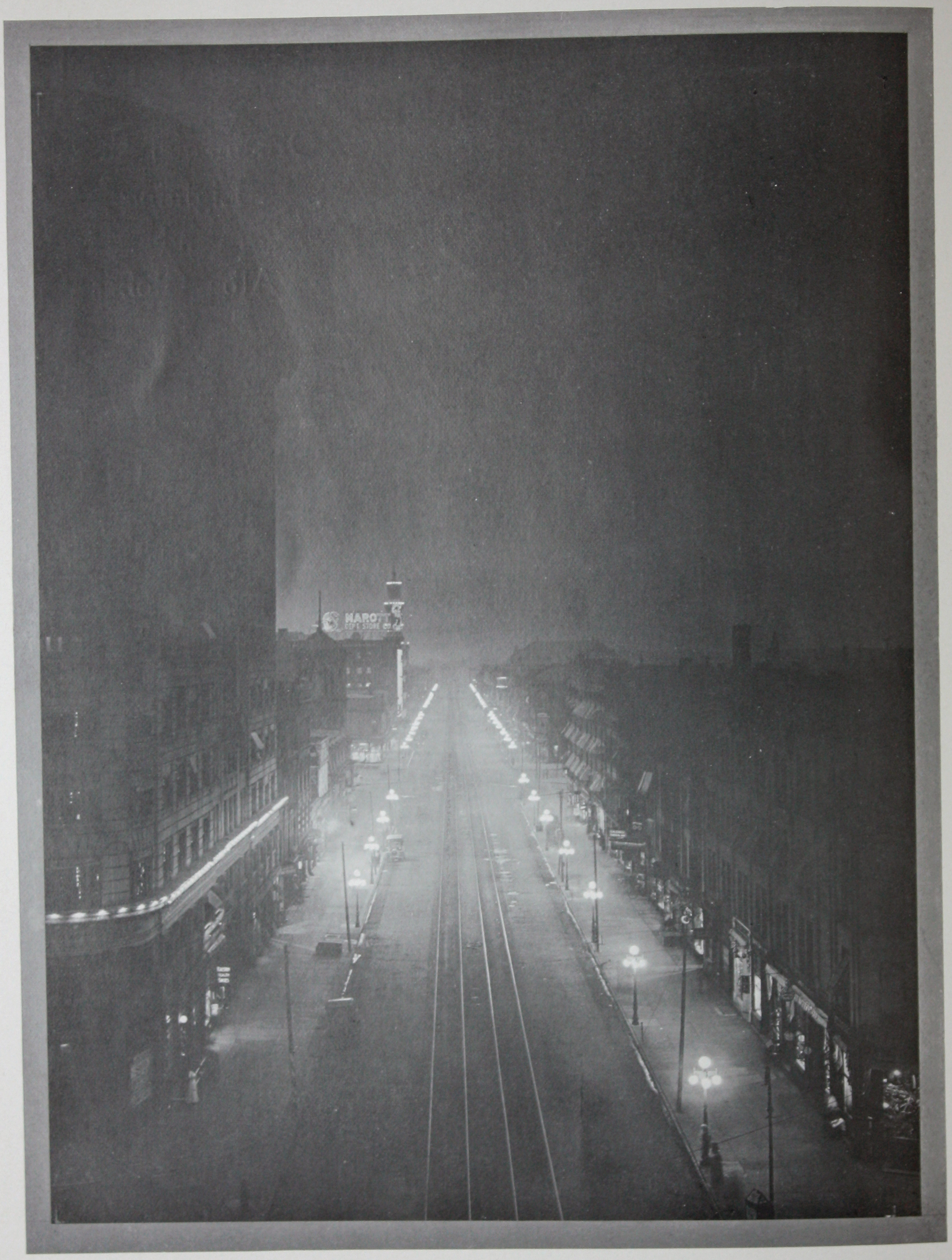
252-19.

ORNAMENTAL STREET LIGHTING *and* ALBA GLOBES

MACBETH-EVANS GLASS CO
PITTSBURGH

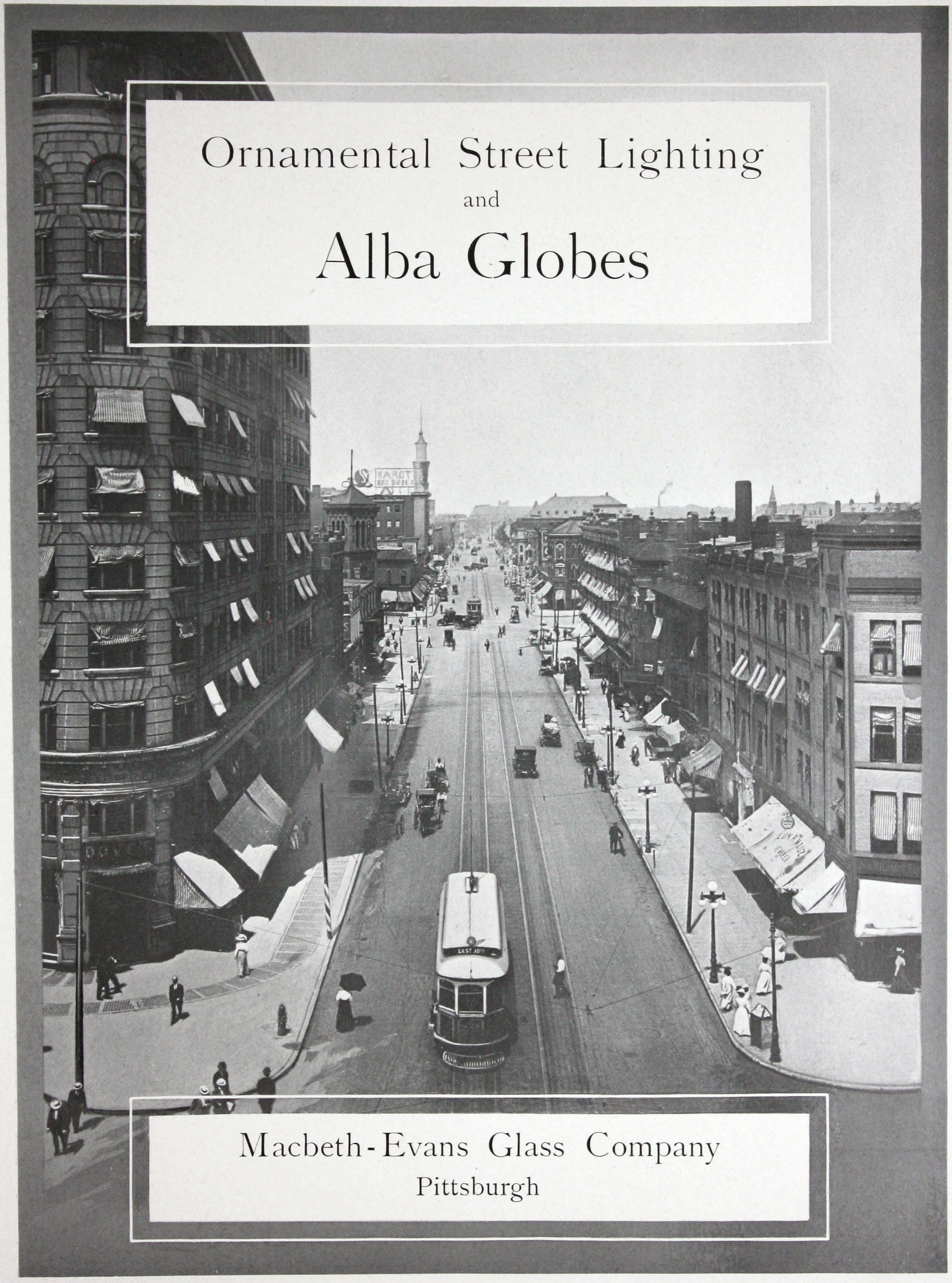
Ornamental Street Lighting and Alba Globes





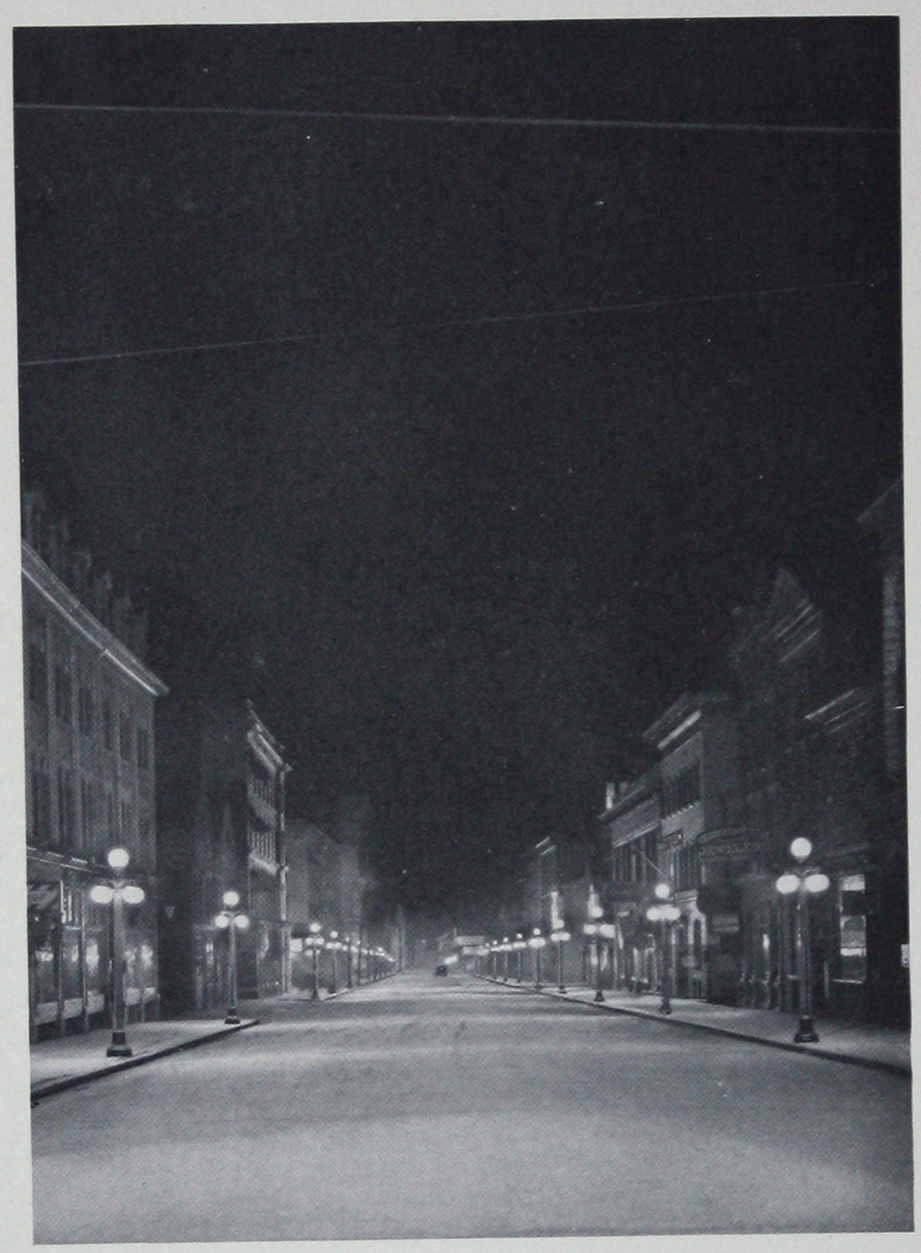
Alba Installation: Massachusetts Avenue, Indianapolis. Day scene is shown on opposite page

Ornamental Street Lighting
and
Alba Globes



Macbeth-Evans Glass Company
Pittsburgh

COPYRIGHT 1912 BY MACBETH-EVANS GLASS COMPANY



PREPARED BY JOHN O POWERS COMPANY NEW YORK

ENGRAVED AND PRINTED BY BARTLETT-ORR PRESS NEW YORK

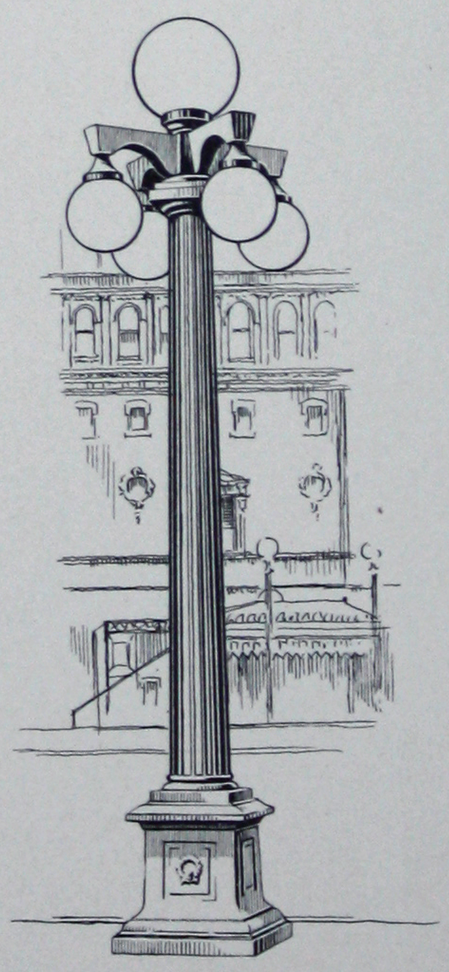
Street illumination is one of the most important features of municipal equipment; for, when properly done, it means three important things:

1. Commercial development of the city—"trade follows the light."
2. Illumination value—safety and comfort for vehicles and pedestrians.
3. Civic beauty—enjoyment of the city by its citizens.

To attain these three results the system of illumination must be such that a sufficient amount of light is evenly distributed without harshness or glare or sharp shadows. The lighting equipment must be handsome by day and by night. Also, the cost must not be excessive.

This is the subject of this book: handsome, efficient, useful street lighting at moderate cost.

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Good Street Lighting

The Money Value

A good street lighting system must be both efficient and attractive. It must give even, thorough, agreeable illumination, and must add to the appearance of the highways in the daytime as well as at night.

Such a street lighting system has a very practical value to business men. The best lighted street draws the largest crowd—and the better the light, the bigger and better the crowd. People enjoy pleasant surroundings out-of-doors as much as they do indoors; comfort and pleasant surroundings put them in a buying-mood. So trade grows.

Good street lighting makes money for a city by adding to its attractiveness, increasing its trade, and advertising it to the people of other places without special additional expense. It saves money by making the streets safer—freer from accidents and crime. And, though the cost of installation is sometimes more than it is for a poor lighting system, once in operation it provides more light and better light for the same money, or for less.

It is a matter of right planning, not of big appropriations.

The system of street lighting found by experience to be in every way the best, is known by various names, but the most common name is "Ornamental", and, although that describes only one of its many valuable features, we shall use the name "Ornamental" in our references to it hereafter.

What Poor Lighting Does

A poor street lighting system is wasteful as well as inefficient and hideous. Nearly all its cost is a loss. And it costs in many indirect ways—costs



Alba Installation : Gary, Indiana

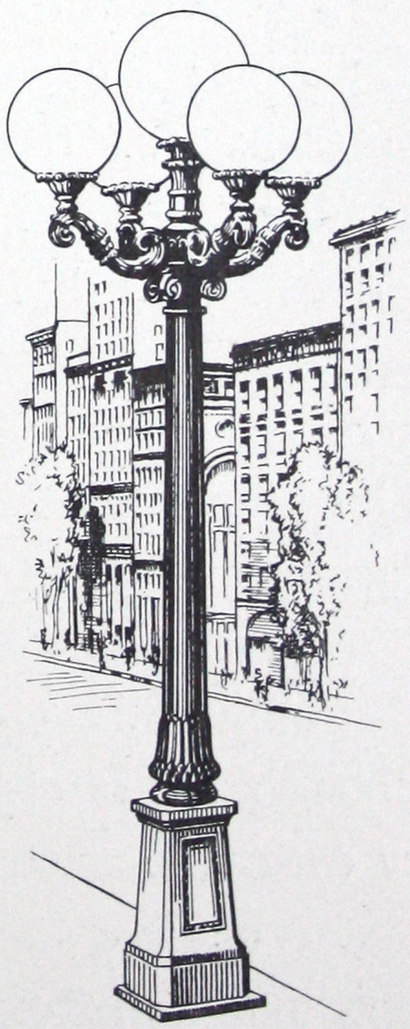
individual citizens more as business men than as taxpayers, in some cases. A street scattered with towering, unstaple wooden poles, shabby except when they are newly painted, and topped with gaunt arc lamps which are ugly by day, and appear as flickering points of painful brilliancy by night, is not a good business street. It is even worse as a residence street. And swaying lamps suspended from brackets or from wires stretched across the highway are as bad as an unsightly procession of poles. A large part of the light that such systems give is wasted in mid-air, because the light-sources are of necessity so high above the street, and there are heavy shadows on the street, where uniform illumination is needed.

People live and do business on streets thus deprived of proper light not because they want to, but because they have to. That certainly does no city any good.

What Good Lighting Does

Good street lighting provides an abundance of agreeable light where it is needed, and the equipment with which it does this adds decorative effect to the appearance of a street.

It gives even brightness all over the street, on footway and roadway, without heavy shadows. No glare in one place and inky blackness in another. Objects at a distance are plainly visible with such light. It also brings out to best advantage the surroundings of the street, the stores and other buildings.

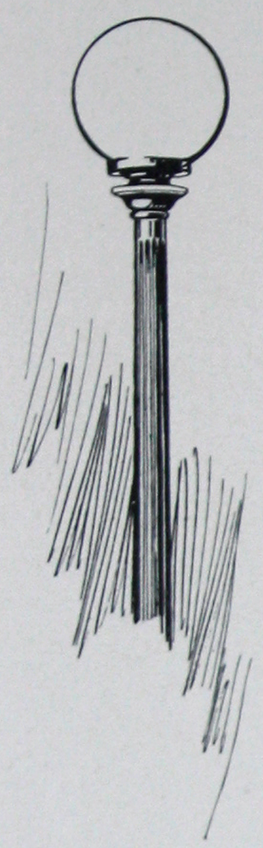


Good illumination is not only sufficient and agreeable but is free on the one hand from deep shadows, and on the other hand, from spots of piercing brilliancy.

Wherever there are intensely brilliant light-sources without diffusing globes, the effect is dazzling. The pupil of the eye unconsciously contracts to protect the eye against the injurious effect of this piercing light and this makes seeing almost as difficult as does the lack of light—and much more painful.

Anybody who has looked directly at the usual form of arc lamp knows the momentary partial blindness and discomfort that follows. The same effect, though somewhat

modified, is produced repeatedly by a series of street arc lamps that come into the line of vision intermittently. The points of brilliancy distract the eyes from immediate surroundings, and tire them so that they do not see well. This strain is greatly reduced by Alba globes; but it is much better to have less brilliant sources of illumination nearer together, as this gives a gentler, more even illumination, with which one can see perfectly and without strain.



The whole equipment of Ornamental Street Lighting is handsome—posts, globes and light. It adds to the appearance of the street and of the buildings that line it, during daylight as much as after dark.

What the Ornamental System Is

Clusters of high-candle-power Tungsten, or Mazda, incandescent lamps are used. They are mounted on metal or concrete posts that harmonize in design with the character of the surroundings, and are placed at such a height, and spaced at such intervals, and so equipped with diffusing globes, that there is even light of the right intensity at the right place. This is a matter which may be determined by exact engineering calculations.

Since Tungsten lamps are used in this form of lighting there is no necessity for frequent renewals of electrodes. This means less frequent handling and consequently less globe breakage. Also, there are no inner globes to break from heat.

The posts used are important for their decorative qualities. There are many kinds, varying in design and in cost to meet any municipal requirement. The illustrations in this book give only the merest hint of their infinite variety and great beauty.

The globes in which the lamps are enclosed are of special importance. Not only do they make or mar the beauty of the lights and their decorative effect, but they either let through the maximum of usable light, or smother it by excessive absorption.

We have made glass for street illumination through all the stages of development of outdoor lighting, from crude lanterns to the highly perfected

system just described. We make every kind that is used. The best of all is Alba; and the most successful and satisfactory street lighting systems today are equipped with Alba glassware.

What Alba Is

Alba is a white diffusing glass of very low light-absorption. That is, the maximum quantity of light passes through it, and it spreads the illumination over a wide area. It affords perfect protection against the discomfort caused when the light-source is plainly visible. An Alba globe is evenly illuminated over its entire surface and does not present any "bright spots" in the immediate region of the lamp it encloses. It is a ball of light.

Alba has a beautiful, soft, "snowy-white" color in the daytime, and at night transmits the true color of the light as it comes from the lamp. Many "opal", "opalescent", and "alabaster" globes have excessive "selective absorption", causing a pronounced reddish tinge in the light that passes through them, and resulting in a disagreeable appearance.

Alba globes are smooth, both inside and out, and therefore do not collect dirt and may be easily cleaned. Some of our customers tell us that they keep their Alba globes in perfect condition by merely wiping them with a dry cloth when making lamp renewals. This is in strong contrast to the universal experience with "roughed" glass of any kind.

For durability Alba globes are unexcelled. Sand-blasting glass—which is the commonest way of making it "clouded"—weakens it. All "crystal-roughed-inside" globes are fragile. Reports from users prove that breakage of Alba is almost invariably due to accidents, not to any weakness of the glass. This is specially important in outdoor service, and makes Alba most economical for such use.

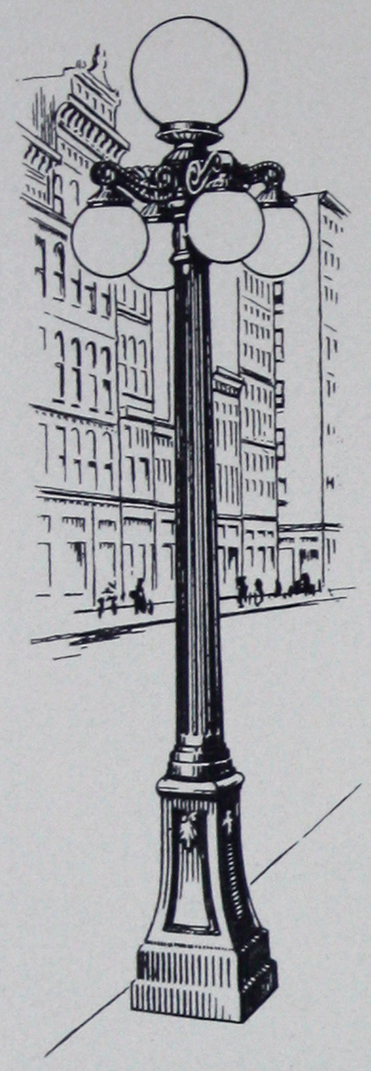
Details of Installation

In planning an Ornamental Street Lighting system, each case must be treated according to its individual requirements. There are, however, a number of vital points which are common to all such installations. These are considered here.

The size of lamp used varies according to the post spacing, the height of posts, the degree of illumination desired, and the amount of money available. The most common practice is to use five 100-watt multiple Mazda or

Tungsten lamps in a group on each post. These may all be arranged in upright positions, or one may be upright and four pendent.

Aside from the question of appearance there are arguments in favor of both the upright and the pendent positions of the globe. In the pendent position there is a somewhat greater tendency to distribute the light toward the pavement, where it is wanted, instead of spreading a considerable portion of it above the top of the post. In this arrangement, also the useful light is not obstructed by the supporting arms.



On the other hand, some users have found that the upright position is more effective in keeping dirt and insects out of the globes. They argue that, with this arrangement, the rain has a tendency to wash the dirt from the globe rather than into it. A few of the different types of posts are shown in the accompanying illustrations.

One 100-watt and four 60-watt lamps, or even all 60-watt lamps, are sometimes used, but the resulting illumination is not as good as when a greater wattage per post is used. In small cities, or in the outlying districts of large cities, posts with three lamps or even less give excellent service.

It is the almost universal practice to use four 12-inch globes with 6-inch fitters on the four lower lamps of a standard post group, and one 16-inch globe with an 8-inch fitter on the upper lamp. Sizes may be varied both in globe diameter and fitter dimensions, but this combination seems to harmonize well with most types of posts.

The question of post spacing is one that is treated in various ways with as many different results. With five 100-watt lamps at a height of 12 feet from the ground, a spacing of 70 to 85 feet on both sides of a normal street will give excellent illuminating results. Where there is not perfect regularity of streets, the exact distance between posts must vary somewhat in each individual block in order to place posts on the street corners. In some installations attempts have been made to economize and yet get fairly even illumination by "staggering" the posts on the opposite sides of a street. There is undoubtedly some economy in this system, but the loss of beauty and

symmetry more than offsets the comparatively small saving in cost. Anyone who has seen the two systems of post arrangement would never choose the "staggered" system.

The height of post may be varied to conform with the spacing and to give the best illuminating results in specific local conditions, but, as a rule, the center of the top globe is placed from 12 to 13 feet above the ground level. In case the spacing between posts is greater than the average, or the street is very wide, the posts should be higher than this and may even have larger lamps than those indicated on the foregoing page.

The wiring should be underground. This arrangement is somewhat more expensive to install, but it is durable, permanent, and, above all, does not detract from the beauty of the street.

The common practice is to employ the "multiple system" of wiring, but the "series system" is applied in many places with good results. This is a matter which may well be settled by the local electric lighting management, according to the desired method of operation and the equipment and facilities of its generating plant.

The Cost

The cost of erecting and maintaining the Ornamental Street Lighting systems of representative cities has been carefully studied at first hand and through personal visits by representatives of our Illuminating Engineering Department, and the results of these investigations are summarized here for the information of those interested in this important municipal improvement.

The cost of the original installation of an Ornamental Street Lighting system, ready to operate, ranges from $60 to $100 per post, according to whether the details—especially the posts and their equipment—are simple or elaborate, and according to the service required and the conditions affecting wiring, construction work, and the like. In most cases, the central station which furnishes the current pays for the erection of the posts. In some cases, however, this cost is borne by a group of public spirited business men; or by the property owners specially benefited; or by the city, in case the lighting plant is municipally owned; or it may be divided between property owners and their tenants.



Alba Installation : Fourth Street, Dayton, Ohio

The cost of current and maintenance varies widely and is assessed against the user by one of several methods. If the city undertakes to pay this charge, it is usually rated at a fixed price per post per year—from $50 to $60. If the owners or tenants of adjacent property pay this charge, the rating is usually about 10 cents per frontage foot per month.

Almost without exception, movements for Ornamental Street Lighting have been started and fostered by some association of business men. After enthusiasm has been aroused—and some funds raised, perhaps—the co-operation of the local electric light management has always been given willingly. Private enterprise is often more potent in bringing about results than is public enterprise, as is shown in many other undertakings for civic betterment.

Photometric Data

The scientific measurement of illumination—one branch of photometry—gives the most accurate basis for determining the results produced by an illuminating system, by displaying graphically—also in exact figures—the graduated degrees of illumination at different distances from a light-source.

In the following table are shown results of five photometric tests of ornamental street installations in regular service. In all but one of these installations, Alba globes were used. In the other, "crystal-roughed-inside" globes were used, and it is significant that much less satisfactory lighting results were obtained. When you add to this the cost of frequent cleaning of "crystal-roughed-inside", and the consequent breakage resulting from frequent handling, the advantages of Alba are still greater.

	Dayton, O. Alba Globes	Indianapolis Alba Globes	Indianapolis, Crystal Roughed Inside	Toronto, Ont. Alba Globes	Buffalo, N. Y. Alba Globes
Watts per linear foot	8.710	12.800	12.100	9.850	5.680
Watts per square foot	.173	.211	.150	.235	.095
Average foot candles as read	.092	.179	.076	.175	.093

It must be remembered that the illumination considered in the above table is that produced on an area included between the two curb lines, and

does *not* account for illumination produced on any surface *except* the roadway. The foot-candle readings in the foregoing table are the averages of the detail readings shown in the curves and charts on pages 18, 19, 20, and 21. These readings were taken on a horizontal plane 36 inches above the street-level.

Typical Specifications

The following table gives the more important figures and specifications of Ornamental Street Lighting systems in operation in four cities selected as showing average conditions in typical communities of different sizes. It affords a practical basis for estimating the cost of similar installations.

	Dayton, Ohio	Indianapolis, Ind.	Toronto, Ont.	Buffalo, N. Y.
Number of Posts in Installation	400	631	450	86
Typical Street Width	50′ 3″	60′ 8″	42′ 0″	60′ 0″
Post Spacing	75′ to 82′	77′ to 112′	80′ to 100′	105′ to 125′ staggered
Height of Post *	11′ 4″ 12′ 1″	10′ 4″ 12′ 6″	10′ 8″ 13′ 0″	10′ 6″ 12′ 6″
Lamp Arrangement	5 upright	1 upright 4 pendent	1 upright 4 pendent	1 upright 4 pendent
Size of Lamps	4 60-watt 1 100-watt	5 100-watt	5 100-watt	5 60-watt
Size of Globes	(12″ x 6″) (16″ x 8″)	(12″ x 5″) (14″ x 5″)	(12″ x 6″) (14″ x 7″)	(12″ x 6″) (16″ x 8″)
Method of Wiring	Multiple	Multiple	5 Multiple lamps in series on 550V power circuit	Multiple
Kind of Current	Direct	Direct	Alternating	Part Direct and part Alternating
Location of Wiring	Underground	Underground	Underground	Underground
Time of burning	4 lamps out at midnight	All lamps out at midnight	All lamps burn all night	All lamps burn all night

* First figure is height to center of lower globe — second figure is height to center of upper globe.

The Illustrations in this Book

The illustrations of Alba installations were made direct from photographs. The day pictures are, of course, entirely accurate. But in studying the night scenes, account must be taken of the fact that the camera cannot accurately record the effect of the illumination as the eye sees it. For, in order to get the general illumination, the exposure must necessarily be very long, and during that time the source of light itself is greatly over-exposed. So the best we can do is to effect a compromise—which has to be under-exposure of the darker places, and over-exposure of the brighter spots, the sources of light.

Nevertheless, in spite of the unreal and strong contrast presented, this book offers to you the best examples of night illustrations we have ever seen. This is due, in a great measure, to Alba globes—the light resulting is so even.

You will note, of course, that in the night pictures no people are shown. They were on the street, but moving, so made no impression on the plate.

The purpose of these pictures has, however, been accomplished—to show you the beauty of Alba Ornamental Street Lighting by day or night.

Illumination Curves and Charts

The curves and charts on the next four pages show the actual photometric performances of several Ornamental Street Lighting installations.

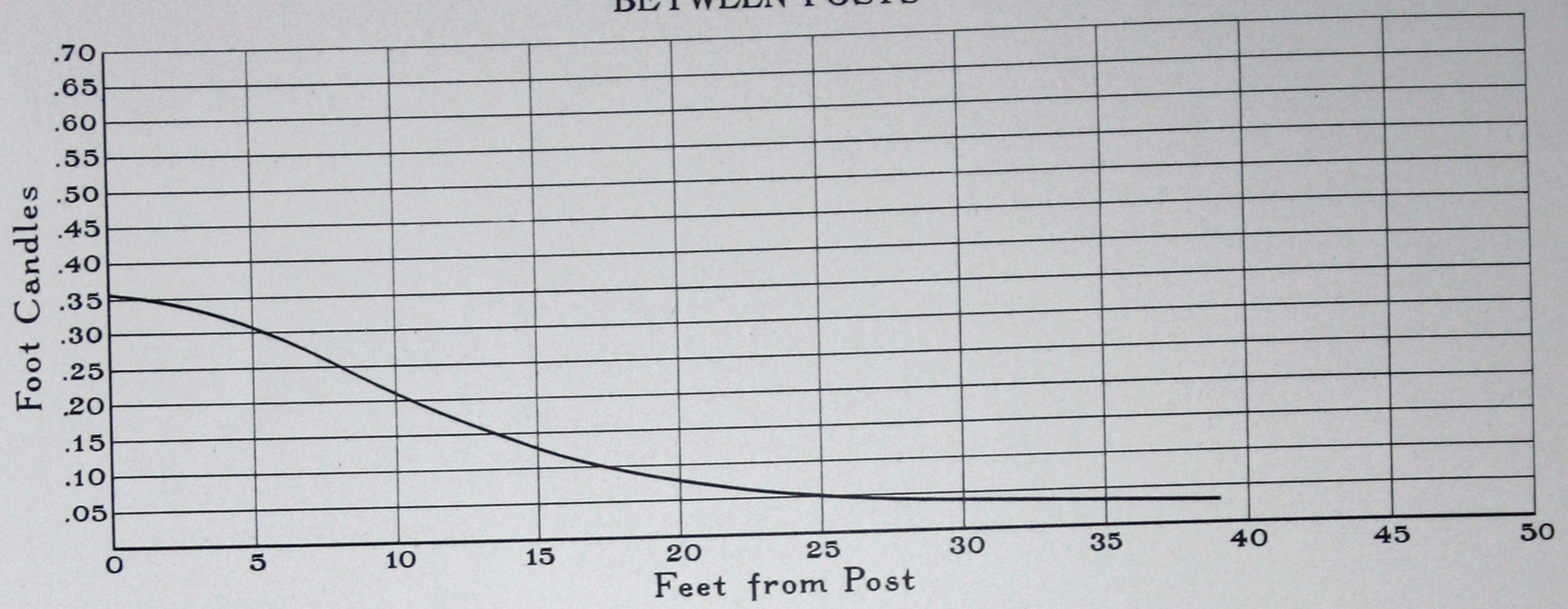
For the "illumination curves" the measurements were made on a line extending between two adjacent posts, and at points a few feet apart. These curves, as presented herewith, show the illumination only to a point midway between the two posts. However, the other part of each curve would be identical with the half shown.

In conjunction with each "illumination curve" is a chart giving the illumination, in foot-candles, at various points in the middle of the street. These points were fixed a few feet apart each way, over a surface covering one-quarter of the total space bounded by four posts. These same readings would, of course, apply to the other quarter-sections of the total space.

Aside from variations in street width, post spacing, size of lamps, and type of globes shown on each chart, the conditions under which the several tests were made were as nearly identical as could be attained.

All readings were taken on a 36-inch plane.

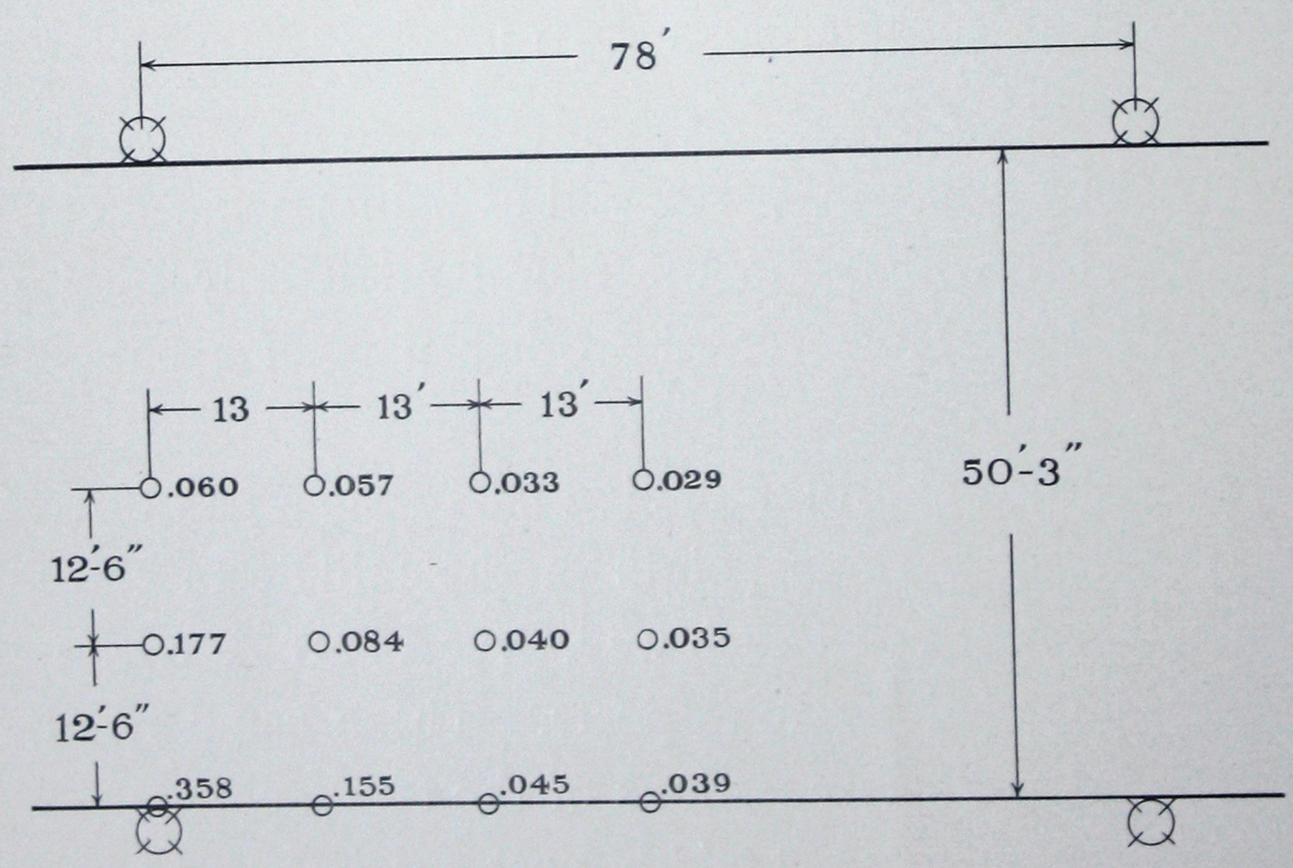
ILLUMINATION CURVE ON LINE BETWEEN POSTS



ALBA BALL GLOBES
1-100w - 4-60w Tungsten

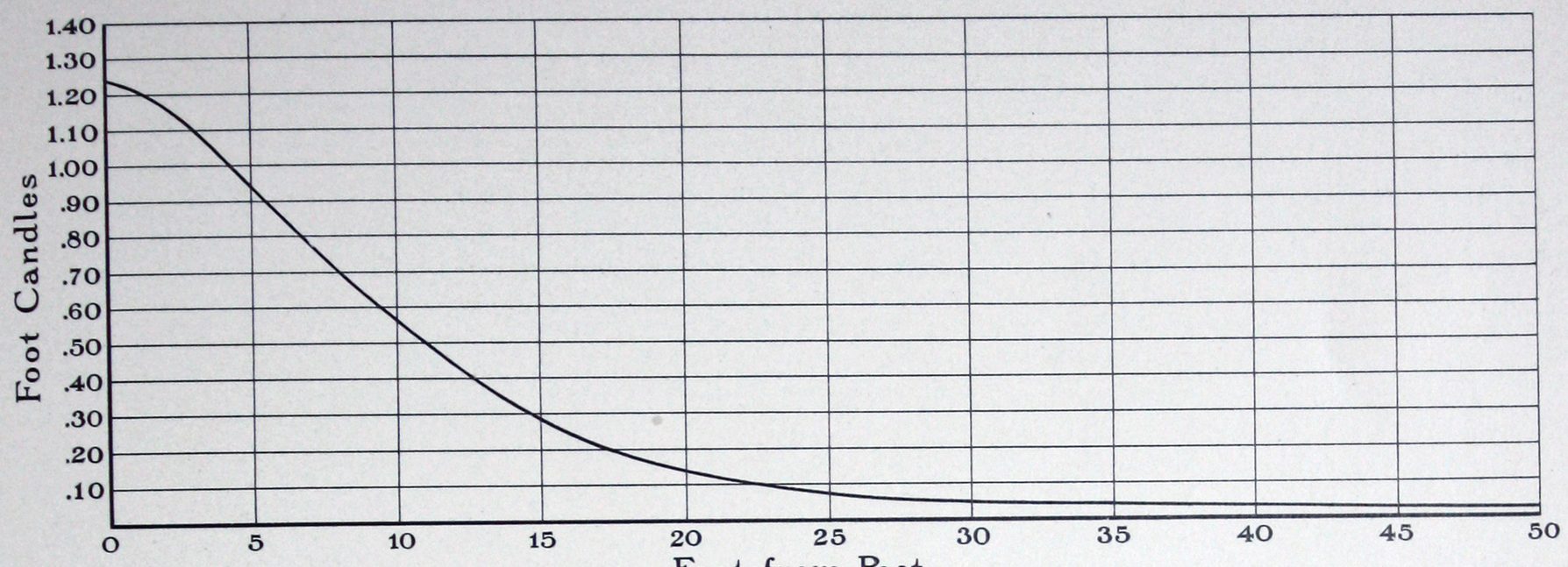
DAYTON, O.
FOURTH ST.

ILLUMINATION CHART
DAYTON, O.
FOURTH ST.



ALBA BALL GLOBES
1-100w - 4-60w Tungsten

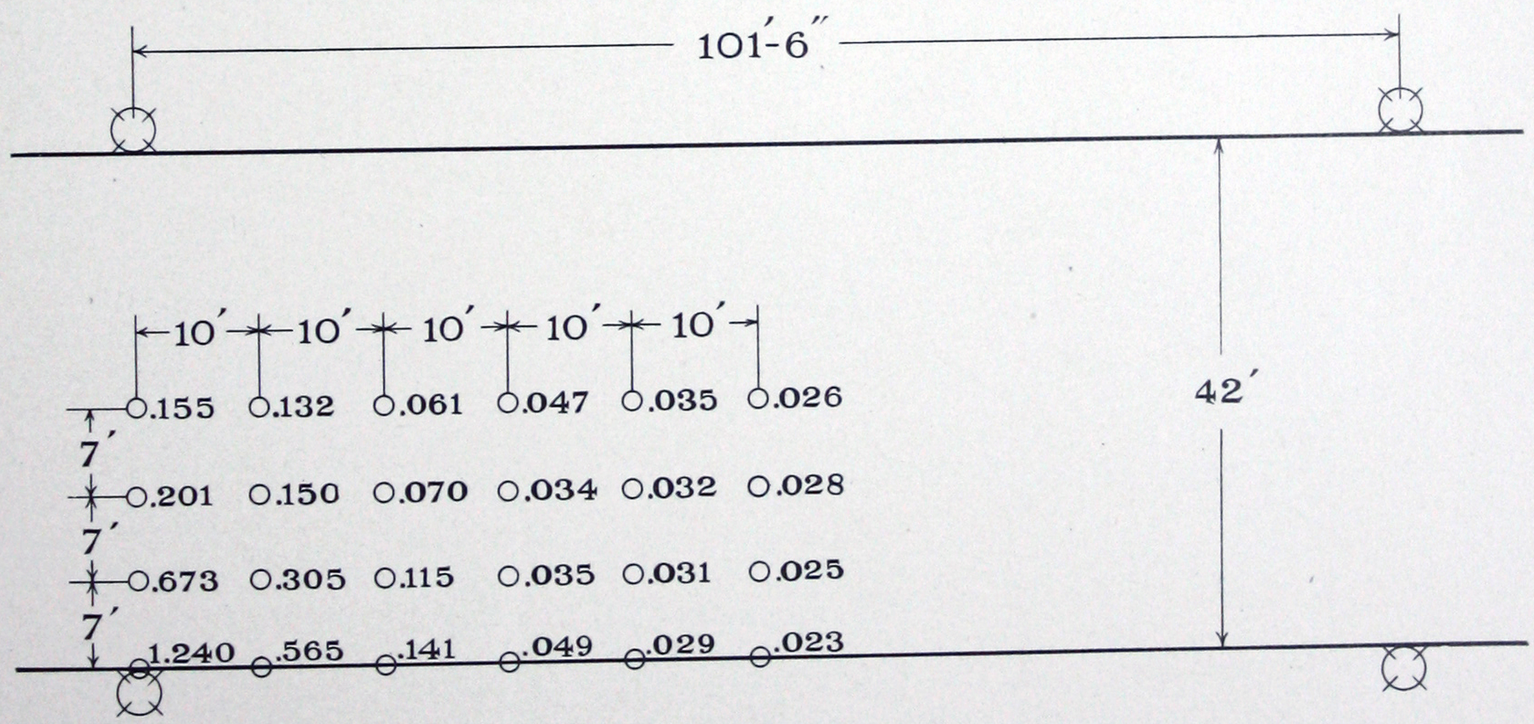
ILLUMINATION CURVE ON LINE BETWEEN POSTS



ALBA BALL GLOBES
5-100w Tungsten

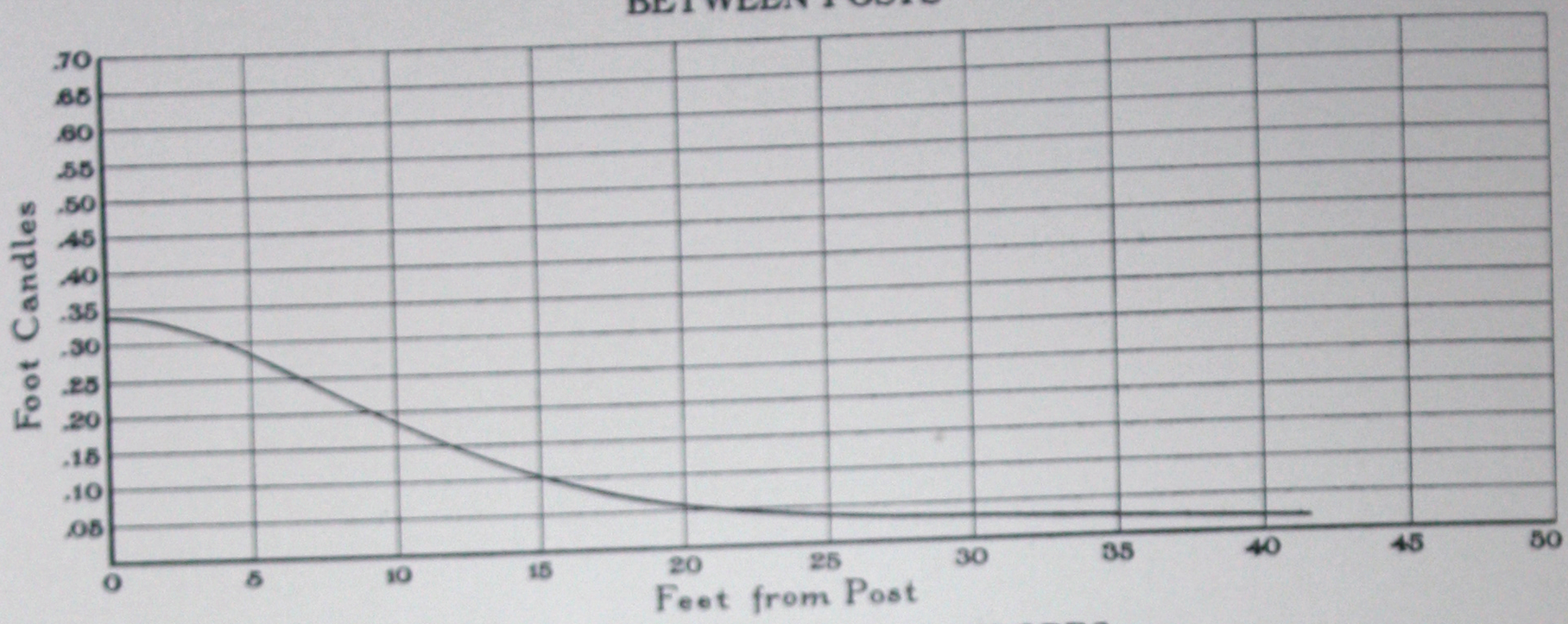
TORONTO, ONT.
KING ST. E.

ILLUMINATION CHART TORONTO, ONT. KING ST. E.



ALBA BALL GLOBES
5-100w Tungsten

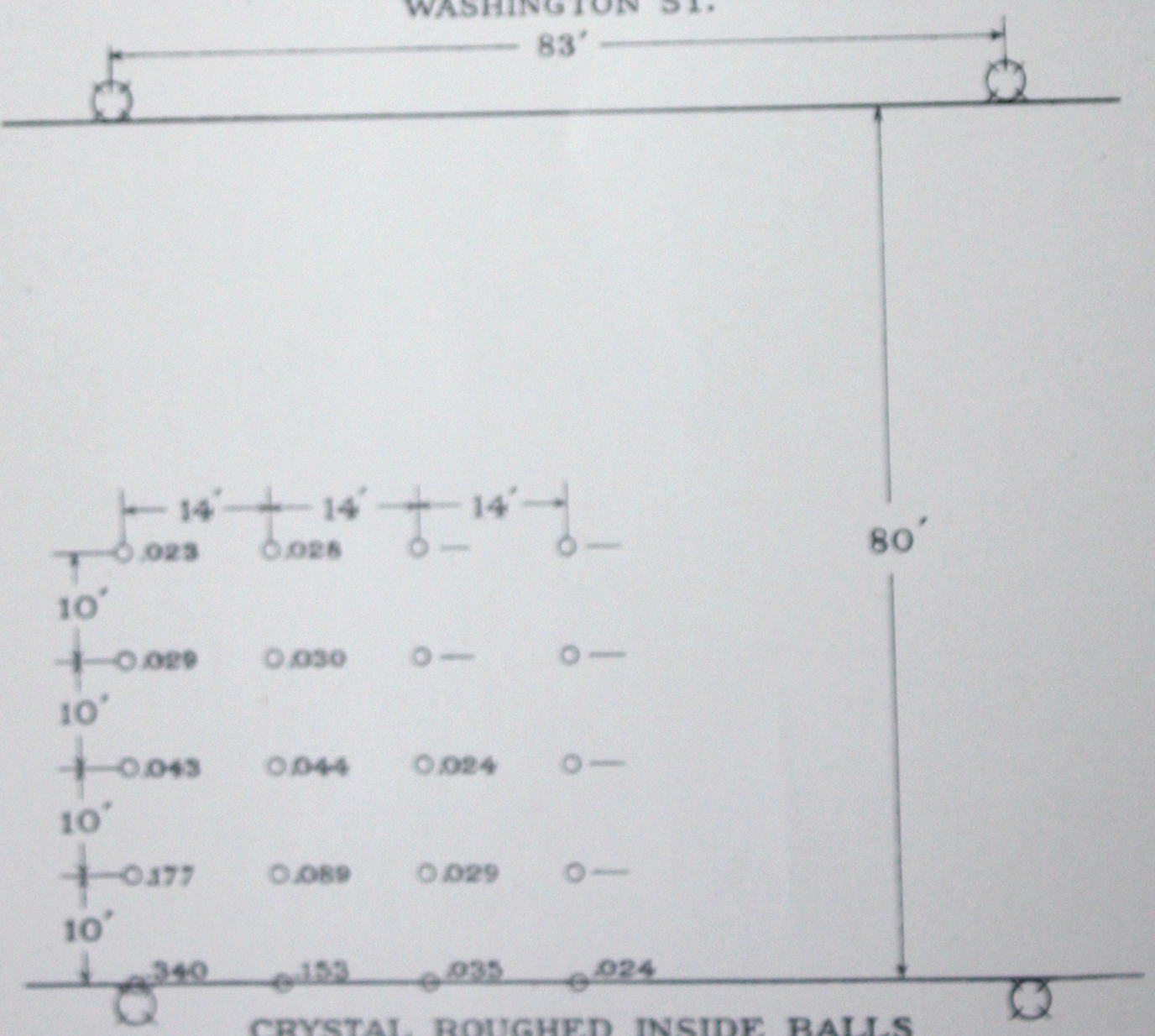
ILLUMINATION CURVE ON LINE BETWEEN POSTS



CRYSTAL ROUGHED INSIDE GLOBES
5-100 w Tungsten

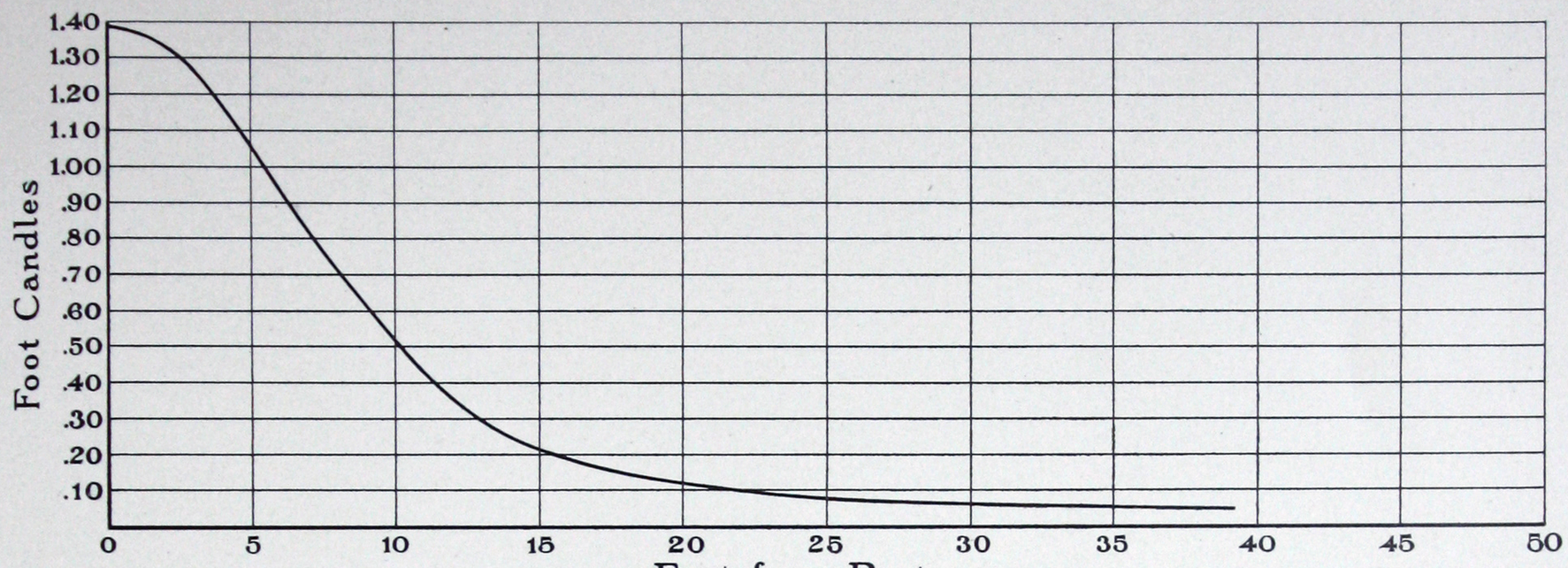
INDIANAPOLIS. IND.
WASHINGTON ST.

ILLUMINATION CHART
INDIANAPOLIS, IND.
WASHINGTON ST.



CRYSTAL ROUGHED INSIDE BALLS
5-100 w Tungsten

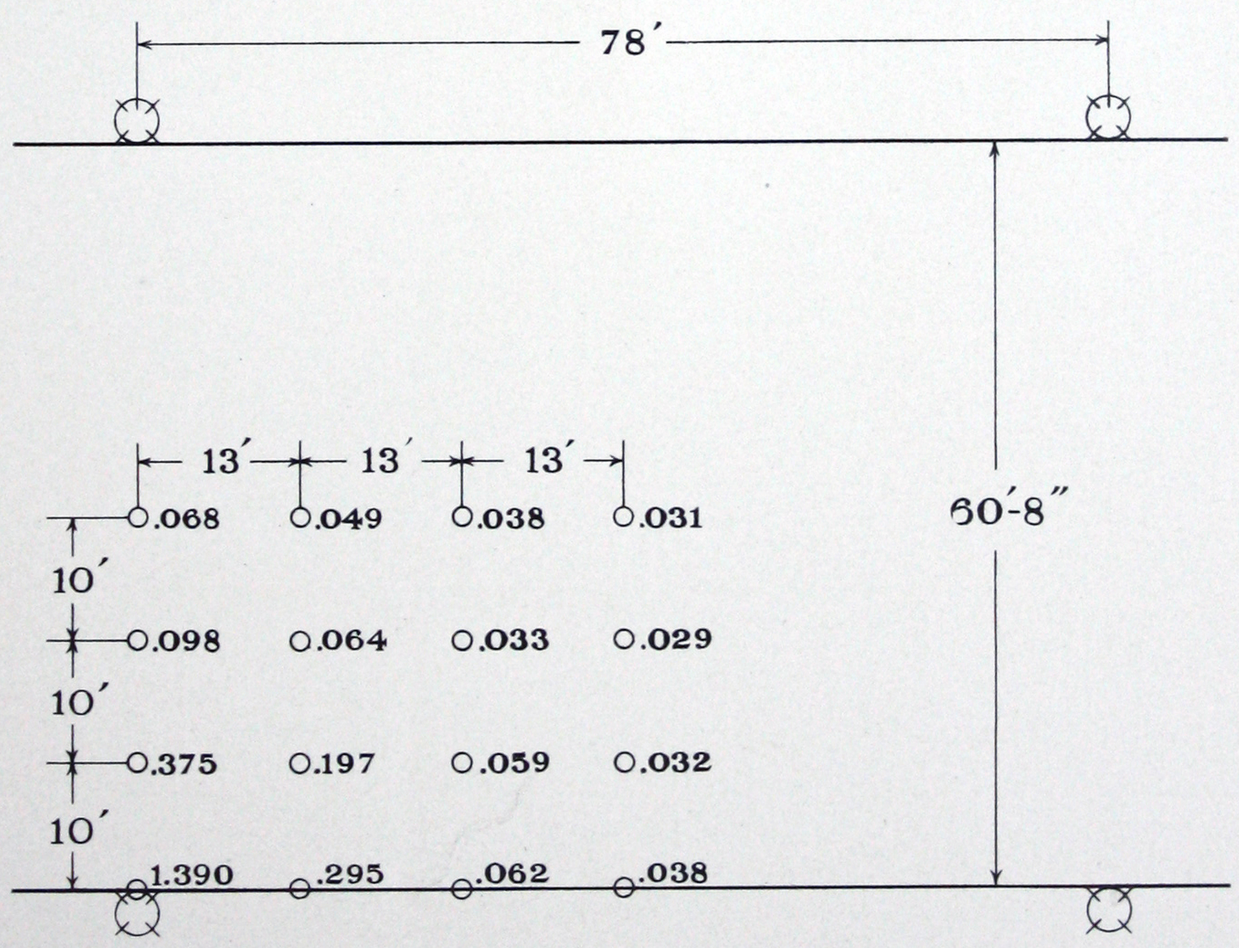
ILLUMINATION CURVE ON LINE BETWEEN POSTS



ALBA BALL GLOBES
5-100 w Tungsten

INDIANAPOLIS, IND.
MASSACHUSETTS AVE.

ILLUMINATION CHART INDIANAPOLIS, IND MASSACHUSETTS AVE.



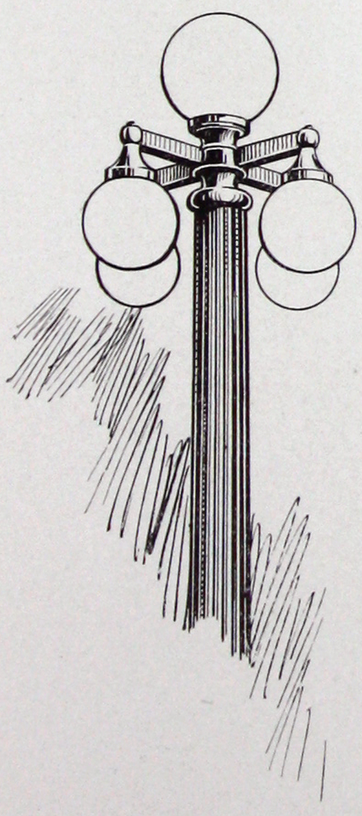
ALBA BALL GLOBES
5-100 w Tungsten



Alba Installation: King Street, Toronto, Ont.



Alba Installation: Hamilton, Ohio



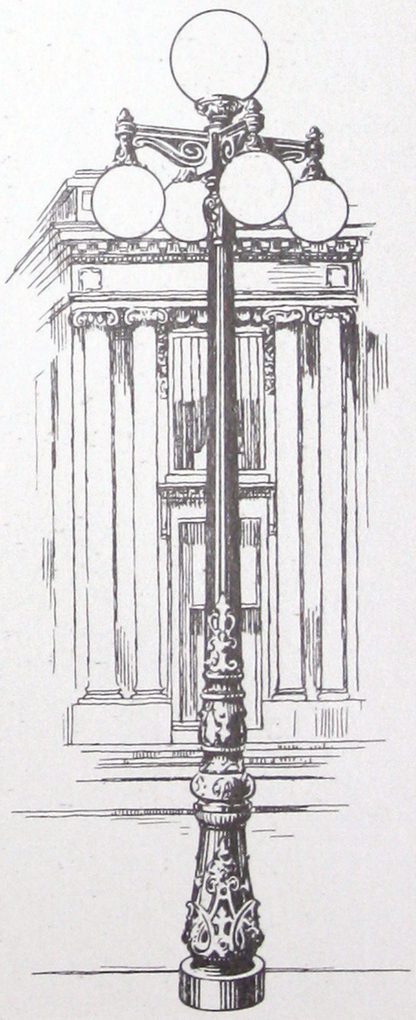
Alba Installation: King Street, Toronto, Ont.



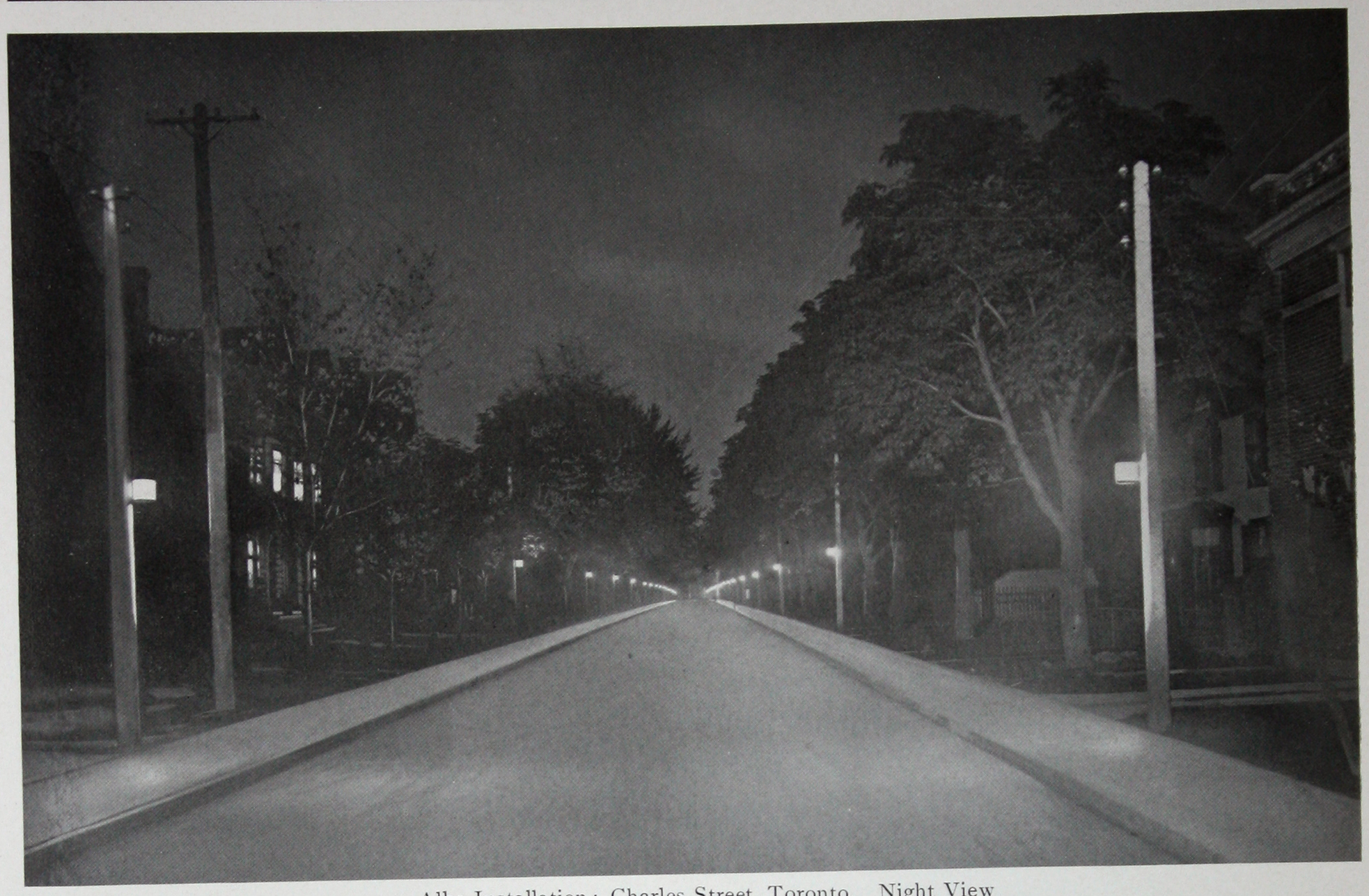
Alba Installation : Monument Square, Indianapolis



Alba Installation: Warren, Ohio



Alba Installation: Monument Square, Indianapolis



Alba Installation: Charles Street, Toronto. Night View



Alba Installation: Charles Street, Toronto. Day View



Alba Installation : Bay Street, Toronto. Night View



Alba Installation : Bay Street, Toronto. Day View



Alba Installation: Lincoln Park Boulevard, South from Burton Place, Chicago. Night View



Alba Installation: Lincoln Park Boulevard, South from Burton Place, Chicago. Day View



Alba Installation: Entrance to Lincoln Park, Looking North on Lincoln Park Boulevard, Chicago. Night View



Alba Installation: Entrance to Lincoln Park, Looking North on Lincoln Park Boulevard, Chicago. Day View



Alba Installation: Michigan Avenue, Chicago. Night View



Alba Installation: Michigan Avenue, Chicago. Day View



Alba Installation: Genesee Street, Buffalo. Night View



Alba Installation: Genesee Street, Buffalo. Day View

Engineering Help

The facilities of our Illuminating Engineering Department are at the service of any city government, central station, or group of citizens interested in Ornamental Street Lighting.

If you and your associates believe that your city should improve its street lighting — and there are few American communities where such an improvement is not of so great commercial importance as to be an urgent municipal need — state your problem to our Illuminating Engineers, and we will suggest and advise, and, if you wish, furnish tentative estimates of cost, which will help you in reaching your conclusions.

We have no direct interest in street illumination except so far as glass is involved. We make every kind of street lighting glassware, and we want people to use the best kind for whatever purpose they have in mind because they will be better satisfied with the results.

The reason we recommend Alba above all others is because it gives the most general satisfaction for street lighting globes and is the only glass, so far as we know, that meets adequately the requirements of the Ornamental System.

Macbeth-Evans Glass Company

Illuminating Engineering Department

Pittsburgh

New York: Uptown, 19 West 30th Street
Downtown, 1 Hudson Street corner Chambers Street

Boston: 30 Oliver Street

Chicago: 172 West Lake Street

Philadelphia: 42 South Eighth Street

Toronto: 70 King Street West

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